

## PURE METAL POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA1030	Aluminum (Al) 99% Gas Atomized	101030	-45 + 5 $\mu\text{m}$ (-325 mesh + 5 $\mu\text{m}$ )	Standard Grade	Soft and ductile. Corrosion resistant. Good electrical and thermal conductivity. Non-magnetic, can be used for electromagnetic shielding.
HA1030-2	Aluminum (Al) 99% Gas Atomized	101030-2	-90 + 45 $\mu\text{m}$ (-170 + 325 mesh)	EMS 38850 PWA 1320 EMS 57743	
HA4155	Copper (Cu) 99.0% Semi-Spherical, Water Atomized	104105	-106 + 45 $\mu\text{m}$ (-140 + 325 mesh)	Standard Grade	Good electrical and thermal conductivity Coatings are soft, ductile and moderately oxidation resistant. Non-magnetic.
HA4155-2	Copper (Cu) 99.0% Spherical, Gas Atomized	104155	-88 + 25 $\mu\text{m}$	Standard Grade	
HA2024	Chromium (Cr) 99.5% Irregular	102024	-45 $\mu\text{m}$ (-325 mesh)	GE B10D5 PMC9753-1	Good flowability and high density. Corrosion resistant.
HA5000	Iron (Fe) 99.5% Water Atomized	105000	-106 + 15 $\mu\text{m}$ (-140 mesh + 15 $\mu\text{m}$ )	Standard Grade	Tough, hard coatings with excellent sliding properties and wear resistance
HA6102	Molybdenum (Mo) 99% Spherical	106102	-90 + 45 $\mu\text{m}$ (-170 + 325 mesh)	PWA 1313 MSRR 9507/1 CPW 213 EMS 5670	High density coatings that require grinding to finish. Resistant to electric arc erosion in oxidizing or atmospheric conditions.
HA6103	Molybdenum (Mo) 99% Sintered, Crushed	106103	-74 + 45 $\mu\text{m}$ (-200 + 325 mesh)	EMS 57738 EMS 56705 CPW 213 MSRR 9507/19 DMR 33.017 PM 819-13	
HA6105	Molybdenum (Mo) 99% Spray-Dried, Crushed	106913	-45/D $\mu\text{m}$ (-325 mesh)	Standard Grade	
HA7400	Niobium (Nb) Angular Cast and Crushed	107400	-30 + 5 $\mu\text{m}$ (-500 mesh + 5 $\mu\text{m}$ )	Standard Grade	Good heat resistance in non-oxidizing atmospheres. Used for welding joints.
HA7156	Nickel (Ni) 99.0% Spherical, Gas Atomized	107100	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )		Readily machineable coatings that bonds well to steel. Can be used for salvage and build-up of nickel base alloy components which have been damaged or mis-machined.
HA7166	Nickel (Ni) 99.3+% Precipitated	107166	-53 + 20 $\mu\text{m}$ (-270 mesh + 20 $\mu\text{m}$ )	Standard Grade	
HA7166-2	Nickel (Ni) 99.3+% Precipitated	109197	-74 + 45 $\mu\text{m}$ (-200 + 325 mesh)	MSRR 9513	
HA9197	Silicon (Si) 99.9% Angular	109106	-45 + 5 $\mu\text{m}$ (-325 mesh + 5 $\mu\text{m}$ )	Standard Grade	Stable thermal properties, resistant to decomposition and chemicals, and are biologically adaptable. Typically used for semiconductor equipment component protection.
HA9106	Tungsten (W) 99.5%	109106	-45 $\mu\text{m}$ (-325 mesh)	Standard Grade	High purity material used in high speed steels for cutting tools and in lamp filaments. Tungsten forms a protective oxide in air and can be oxidized at high temperatures.
HA9106-1	Tungsten (W) 99.5%	109918	-74 + 45 $\mu\text{m}$ (-200 + 325 mesh)	Standard Grade	
HA9918	Titanium (Ti) 99% Spherical, Dense	109918-1	-63 $\mu\text{m}$ (-230 mesh)	Standard Grade	Very dense coatings for corrosion resistance in sea water, chloride salt solutions and oxidizing acid solutions (except for pure HCl and pure H <sub>2</sub> SO <sub>4</sub> ). Is a high purity material.
HA9918-1	Titanium (Ti) 99% Spherical, Dense	109918-2	-106 $\mu\text{m}$ (-140 mesh)	Standard Grade	
HA9918-2	Titanium (Ti) 99.4% Irregular	109930	-90 + 11 $\mu\text{m}$ (-170 mesh + 11 $\mu\text{m}$ )	Standard Grade	
HA9000	Zinc (Zn), 99.5% Irregular	109000	-74 $\mu\text{m}$ (-200 mesh)	Standard Grade	Corrosion resistant. Good electrical and thermal conductivity.

## ALUMINUM BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA1020-1	Al 12Si Spherical, Gas Atomized	211111	-45 + 5 $\mu\text{m}$ (-325 mesh + 5 $\mu\text{m}$ )	PWA 1335	General purpose material for repair and build-up of aluminum and magnesium base components, including jet engine parts. Harder than pure aluminum. Good machinability.
HA1020	Al 12Si Spherical, Gas Atomized	211102	-90 + 45 $\mu\text{m}$ (-170 + 325 mesh)	GE B50TF92 CL A EMS 57742 PWA 1335 CPW 235	
HA1020-2	Al 12Si Spherical, Gas Atomized	211020	-125 + 45 $\mu\text{m}$ (-120 + 325 mesh)	Mil-P-85856 Type 1, CL II, Comp E Rev 4	

## COBALT BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA1103	Co 25Cr 10Ni 7.5W Spherical, Gas Atomized	221103	-45 + 5 $\mu\text{m}$ (-325 mesh + 5 $\mu\text{m}$ )	CPW 236 EMS 52432 XXIII SMR 33008 MSRR 9507/23 PWA 1316	Resistance to abrasive wear, sliding wear, fretting and cavitation. Excellent oxidation resistance. Produces a thinner, smoother coating, requiring less finishing.
HA1105	Co 25Cr 10Ni 7.5W Spherical, Gas Atomized	221105	-75 + 45 $\mu\text{m}$ (-200 + 325 mesh)	MSRR 9507/3 PWA 1318 CPW 218 DMR 33.007	
HA1245	Co 25Cr 10Ni 7.5W Spherical, Gas Atomized	221245	-53 + 20 $\mu\text{m}$ (-270 mesh + 20 $\mu\text{m}$ )	Standard Grade	
HA1221	Co 27Cr 5.5Mo 2.8Ni 2Fe .25C Spherical, Gas Atomized	221221	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	Standard Grade	Excellent high temperature strength and stability. Resistance to galling (under self-mated conditions), cavitation erosion, and corrosion.
HA1221-1	Co 27Cr 5.5Mo 2.8Ni 2Fe .25C Spherical, Gas Atomized	221221-1	-150 + 45 $\mu\text{m}$ (-100 + 325 mesh)	Standard Grade	
HA1221-2	Co 27Cr 5.5Mo 2.8Ni 2Fe .25C Spherical, Gas Atomized	221221-2	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	Standard Grade	
HA1106	Co 28Cr 4W 3Fe 3Ni Spherical, Gas Atomized	221106	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	Standard Grade	Outstanding self-mated anti-galling properties. High temperature hardness and high resistance to cavitation erosion. Excellent resistance to many forms of mechanical and chemical degradation over a wide temperature range.
HA1106-4	Co 28Cr 4W 3Fe 3Ni Spherical, Gas Atomized	221106-3	-150 + 45 $\mu\text{m}$ (-100 + 325 mesh)	Standard Grade	
HA1106-3	Co 28Cr 4W 3Fe 3Ni Spherical, Gas Atomized	21106-3	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	Standard Grade	
HA1124	Co 28Cr 20W 5Ni 1V Spherical, Gas Atomized	221114	-75 + 45 $\mu\text{m}$ (-200 + 325 mesh)	GE B50A842 CL A	Excellent high temperature wear and oxidation resistance coatings. Hard dense deposits.
HA1122	Co 29Cr 8W 3Fe 3Ni Spherical, Gas Atomized	221112	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	Standard Grade	Excellent wear, abrasion, and cavitation resistance, excellent sliding properties. Oxidation and corrosion resistance.
HA1122-1	Co 29Cr 8W 3Fe 3Ni Spherical, Gas Atomized	221112-1	-150 + 45 $\mu\text{m}$ (-100 + 325 mesh)	Standard Grade	
HA1122-2	Co 29Cr 8W 3Fe 3Ni Spherical, Gas Atomized	221112-2	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	Standard Grade	
HA1900	Co 22Mo 17Cr 16.7Ni 2.9Si Spherical, Gas Atomized (Tribaloy® 900)	221739	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	Standard Grade	Excellent wear, abrasion, and cavitation resistance, excellent sliding properties. Oxidation and corrosion resistance.
HA1900-1	Co 22Mo 17Cr 16.7Ni 2.9Si Spherical, Gas Atomized (Tribaloy® 900)	221739-1	-106 + 45 $\mu\text{m}$ (-140 + 325 mesh)	Standard Grade	
HA1900-2	Co 22Mo 17Cr 16.7Ni 2.9Si Spherical, Gas Atomized (Tribaloy® 900)	221739-2	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	GE B50TF155 CL A EMS 52432 XVI BMS 10-67-15	
HA1109	Co 28Mo 8.5Cr 2.6Si Spherical, Gas Atomized (Tribaloy® 400)	221109	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	GE B50TF155 CL A BMS 10-67H Type XV	Excellent mechanical wear resistance with good corrosion resistance. Good hot hardness with both hot corrosion and oxidation properties. Low coefficient of friction. Smooth as-sprayed.
HA1400-2	Co 28.5Mo 8.5Cr 2.6Si .08C Spherical, Gas Atomized (Tribaloy® 400)	221735-2	-106 + 45 $\mu\text{m}$ (-140 + 325 mesh)	Standard Grade	
HA1400-3	Co 28.5Mo 8.5Cr 2.6Si .08C Spherical, Gas Atomized (Tribaloy® 400)	221735-3	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	Standard Grade	
HA1101	Co 30Cr 2.45C 12.5W 3Fe 3Ni Spherical, Gas Atomized	221101	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	Standard Grade	Excellent wear, abrasion, and cavitation resistance, excellent sliding properties. Oxidation and corrosion resistance.
HA1101-1	Co 30Cr 2.45C 12.5W 3Fe 3Ni Spherical, Gas Atomized	221101-1	-150 + 45 $\mu\text{m}$ (-100 + 325 mesh)	Standard Grade	
HA1101-2	Co 30Cr 2.45C 12.5W 3Fe 3Ni Spherical, Gas Atomized	221101-2	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	Standard Grade	

## COBALT BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA1111	Co 28.5Mo 17.5Cr 3.4Si .08C 3Ni 3Fe Spherical, Gas Atomized (Tribaloy 800)	221111	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	GE B50TF190 CL A EMS 52432 XV PM 819-15	Higher chromium content than T-400 for improved oxidation and corrosion resistance. Low coefficient of friction. Smooth as-sprayed.
HA1248	Co 28.5Mo 17.5Cr 3.5Si 3Ni 3Fe Spherical, Gas Atomized (Tribaloy 800)	221738	-53 + 20 $\mu\text{m}$ (-270 mesh + 20 $\mu\text{m}$ )	GE B50TF190 DMR 33.021 MSRR 9507/58	
HA1800-2	Co 28.5Mo 17.5Cr 3.4Si .08C 3Ni 3Fe Spherical, Gas Atomized (Tribaloy 800)	221738-2	-106 + 45 $\mu\text{m}$ (-140 + 325 mesh)	Standard Grade	
HA1800-3	Co 28.5Mo 17.5Cr 3.4Si .08C 3Ni 3Fe Spherical, Gas Atomized (Tribaloy 800)	221738-3	-180 + 53 $\mu\text{m}$ (-80 + 270 mesh)	Standard Grade	
HA1217	Co 32Ni 21Cr 8Al 0.5Y Spherical, Gas Atomized	221127	-45 + 5 $\mu\text{m}$ (-325 mesh + 5 $\mu\text{m}$ )	MSRR 753/1 DMR 33.095	For demanding aerospace applications. Used for protective plasma spray coatings in hot corrosive or oxidizing environments.
HA2195	Co 32Ni 21Cr 8Al 0.5Y Spherical, Gas Atomized	221195	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	CPW 528-2	
HA2195-1	Co 32Ni 21Cr 8Al 0.5Y Spherical, Gas Atomized	221195-1	-45 + 20 $\mu\text{m}$ (-325 mesh + 20 $\mu\text{m}$ )	Standard Grade	
HA1159	Co 32Ni 21Cr 8Al 0.5Y Spherical, Gas Atomized	221159	-75 + 38 $\mu\text{m}$ (-200 + 400 mesh)	EMS 57741Grade A MSRR 9507/47 MSRR 9507/73 PM 819-58	
HA1211	Co 32Ni 21Cr 8Al 0.5Y Spherical, Gas Atomized	221211	-90 + 45 $\mu\text{m}$ (-170 + 325 mesh)	GE B50TF195 CL A EMS 55741 GB	
HA1211-2	Co 32Ni 21Cr 8Al 0.5Y Spherical, Gas Atomized	221211-2	-150 + 63 $\mu\text{m}$ (-100 + 230 mesh)	EMS 57741 Grade B GE B50TF195 CL A Howmet Cd 1128	
HA1260-1	CoCrAlY Atomized	221260-1	Proprietary	ES9-362 A	Proprietary
HA1260-2	CoCrAlY Atomized	221260-2	Proprietary	ES9-362 B	

## COPPER BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA4104	Cu 10Al 1Fe Aluminum Bronze Spherical, Gas Atomized	224104	-53 + 5 $\mu\text{m}$ (-270 mesh + 5 $\mu\text{m}$ )	BMS 10-67-2 DMS 2049T1	Moderate oxidation, wear and fretting resistance at low temperatures, good emergency running properties. Easily machined coating.
HA4104-2	Cu 10Al 1Fe Aluminum Bronze Spherical, Gas Atomized	224204-2	-53 + 10 $\mu\text{m}$ (-270 mesh + 10 $\mu\text{m}$ )	PWA 1378D MSRR 9507/29 GE B50TF161 CL B DMR 33.092	
HA4104-5	Cu 10Al 1Fe Aluminum Bronze Spherical, Gas Atomized	224104-5	-125 + 45 $\mu\text{m}$ (-120 + 325 mesh)	GE B50TF161 CL A	
HA4101	Cu 36Ni 5In Spherical, Gas Atomized	224101	-45 + 10 $\mu\text{m}$ (-325 mesh + 10 $\mu\text{m}$ )	GE B50TF72 CL B MSRR 9507/55	Produces dense coatings with good resistance to galling and fretting. Dense coatings with low porosity and oxide content.
HA4102	Cu 36Ni 5In Spherical, Gas Atomized	224102	-90 + 45 $\mu\text{m}$ (-170 + 325 mesh)	GE B50TF72 CL A MSRR 9507/31 DMR 33.016 BMS 10-67-14	
HA4103	Cu 38Ni Spherical, Gas Atomized	224103	-75 + 45 $\mu\text{m}$ (-200 + 325 mesh)	GE B50TF42 CL A PWA 1369 PM 819-42 DMR 33.015	Produces dense coatings for protection against fretting and cavitation. Dense coatings with low porosity and oxide content.

## IRON BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA5211	Fe 13.5Cr .15C Mn Si Spherical, Gas Atomized (410 Stainless Steel)	235211	-45 + 15 µm (-325 + 15 µm)	Standard Grade	Moderately hard coating. Protects against fretting, cavitation and particle erosion. Very good corrosion resistance.
HA5108	Fe 12.5Cr .15C Mn Si Spherical, Gas Atomized (410 Stainless Steel)	235108	-90 + 45 µm (-170 + 325 mesh)	Standard Grade	
HA5420	Fe 12.5Cr Gas Atomized (420 Stainless Steel)	235420	-53 + 20 µm (-270 mesh + 20 µm)	Standard Grade	Hardness with some corrosion resistance. Requires grinding.
HA5431	Fe 15.6Cr 1.8Ni .51Mn .41Si Gas Atomized (431 Stainless Steel)	235431	-106 + 45 µm (-140 + 325 mesh)	Standard Grade	Corrosive resistance coatings. Good for dimensional repair and build-up.
HA5513-1	Fe 17Cr 12Ni 2.5Mo .03C Spherical, Gas Atomized (316L Stainless Steel)	235101	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	Very good corrosion resistance. Smooth coatings, easily machined. Protects against fretting, cavitation and particle erosion. Good for dimensional repair and build-up.
HA5513-7	Fe 17Cr 12Ni 2.5Mo Gas Atomized (316 Stainless Steel)	235101-7	-106+ 45 µm (-140+ 325 mesh)	MSRR 9507/26	
HA5236	Fe 17Cr 12Ni 2.5Mo Gas Atomized (316 Stainless Steel)	235236	-52 + 20 µm (-270 mesh + 20 µm)	Standard Grade	

## MOLYBDENUM BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA6137	Mo 25 NiCr 8Si Blend	246137	-75 + 45 µm (-200 + 325 mesh)	EMS 52432 CL XIV	Self Fluxing. High wear resistance coatings with a low coefficient of friction and good scuffing resistance.
HA6149	MoSi <sub>2</sub> Irregular	246049	-45 µm (-325 mesh)	Standard Grade	Coatings have good strength with excellent resistance to oxidation and thermal shock.

## NICKEL BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA7185	Ni 5Al Composite	257185	-90 + 45 µm (-170 + 325 mesh)	GE B50TF56 CL B PWA 1380 EMS 57746 TIC1 DMR 33.011	The coatings are dense and resistant to oxidation and abrasion. Self-bonding material which exhibits an exothermic reaction during spraying resulting in a good bond. Readily machinable.
HA7109	Ni 5Al Spherical, Gas Atomized	257109	-90 + 45 µm (-170 + 325 mesh)	GE B50TF56 CL A PWA 1337 EMS 57746 Type I EMS 52432 XX CPW 247	
HA7109-2	Ni 5Al Spherical, Gas Atomized	257109-2	-45 + 15 µm (-325 mesh + 15 µm)	GE B50TF56 CL C EMS 39661	
HA7266	Ni 8Cr 7Al 5Fe 5Mo Composite	257266	-106 + 45 µm (-140 + 325 mesh)	EMS 56762 EMS 5432 CL XXIX	Machinable Stainless Steel type coating. Good oxidation and corrosion resistance. Self-bonds to most metallic surfaces.
HA7261-1	Ni 5Al 5Mo Agglomerated, Sintered	257261-1	-90 + 45 µm (-170+325 mesh)	EMS 57749 MSRR 9507/35 GE B50TF166 CL A PM 819-24 PC 110-265 WIMS 645	Tough, moderate resistance to erosion and sliding wear, medium hardness. High bond strength.
HA7204	Ni 10.5Cr 3.3Si 2.0Fe 2B Spherical, Gas Atomized	257004	-106 + 45 µm (-140 + 325 mesh)	Standard Grade	For coatings requiring immediate hardness Excellent machinability and resistance to corrosion, heat, and cracking.
HA7040	Ni 10.5Cr 3.3Si 2.0Fe 2B Spherical, Gas Atomized	257240	-150/D µm (-100/D mesh)	Standard Grade	
HA7040-2	Ni 10.5Cr 3.3Si 2.0Fe 2B Spherical, Gas Atomized	257240-2	-125 + 45 µm ( -120 + 325 Mesh)	Standard Grade	
HA7404	Ni 20Al Clad	257404	-90 + 53 µm (-170 + 270 mesh)	EMS 57746 Type II GE B50TF33 CL A MSRr 9507/4 PWA 1321 DMR 33.010 PM 819-21	Dense coating, resistant to oxidation and abrasion.

## NICKEL BASE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA7365-2	Ni 18Cr 10Co 6.5Al 6Ta Spherical, Gas Atomized Fine Cut	257365-2	-53 +10 µm (-270 + 10 µm)	GE B50TF271 CL C	High deposit efficiency, fusible powder. Withstands abrasion and extreme temperatures.
HA7365-3	Ni 18Cr 10Co 6.5Al 6Ta Spherical, Gas Atomized Coarse Cut	257365-3	-90 +45 µm (-170+ 325 mesh)	GE B50TF271 CL B	
HA7278	Ni 19Cr 19Fe 5Nb 3Mo Gas Atomized	257278	-53 + 20 µm (-270 mesh + 20 µm)	GE B50TF202 CL D DMR 33.502	Highly oxidation resistant.
HA7243	Ni 19Cr 5Al Agglomerated, Sintered	2572243	-90 + 38 µm (-170 + 400 mesh)	PWA1347 EMS 57748 GE B50TF119 CL A MSRR 9507/14	Excellent corrosion and oxidation resistance.
HA7105	Ni 20 Cr Spherical, Gas Atomized Very Fine Cut	257105	-45 +5 µm (-325 mesh +5 µm)	EMS 56772 DMR 33.018 WIMS 646	Produces thin, dense, bright, clean, smooth coatings. Exhibits good bonding characteristics. Resists oxidation and corrosive gases.
HA7105-1	Ni 20 Cr Spherical, Gas Atomized Fine Cut	257262	-53 + 20 µm (-270 mesh + 20 µm)	PWA 1319	
HA7105-2	Ni 20 Cr Spherical, Gas Atomized Fine Cut	257106	-63 +10 µm (-230 mesh +10 µm)	GE B50TF40 CL B MSRR 9507/27 PWA 1317	
HA7105-4	Ni 20 Cr Spherical, Gas Atomized Coarse Cut	257107	-106 + 45 µm (-140 + 325 mesh)	GE B50TF40 CL B MSRR 9507/27 PWA 1317 DMR 33.079	
HA7328	Ni 20Cr 9Mo 3.2Nb+Ta Spherical, Gas Atomized Fine Cut <i>Inconel 625</i>	257328	-45 + 10 µm (-325 mesh + 10 µm)	GE B50TF40 CL A MSRR 9507/8 PWA 1315 EMS 56760 DMR 33.078 CPW 215	Oxidation and corrosion resistant. Excellent choice for nickel and cobalt component restoration.
HA7328-1	Ni 20Cr 9Mo 3.2Nb+Ta Spherical, Gas Atomized Fine Cut <i>Inconel 625</i>	257328-1	-90 + 45 µm (-170 + 325 mesh)	Standard Grade	
HA7265	Ni 21Cr 9Mo 2.5Fe 4Nb Spherical, Gas Atomized <i>Inconel 625</i>	257265	-53 + 20 µm (-270 mesh + 20 µm)	Standard Grade	
HA7625	Ni 21Cr 9Mo 5Fe Spherical, Gas Atomized <i>Inconel 625</i>	257265	-53/D µm (-270/D mesh)	Standard Grade	
HA7625-1	Ni 21Cr 9Mo 5Fe Spherical, Gas Atomized <i>Inconel 625</i>	257265-1	-45 + 10 µm (-325 mesh + 10 µm)	Standard Grade	
HA7625-3	Ni 21Cr 9Mo 5Fe Spherical, Gas Atomized <i>Inconel 625</i>	257265-3	-150 + 45 µm (-100 + 325 mesh)	Standard Grade	
HA7625-4	Ni 21Cr 9Mo 5Fe Spherical, Gas Atomized <i>Inconel 625</i>	257265-4	-180 + 53 µm (-80 + 270 mesh)	Standard Grade	
HA7022	Ni 21.5Cr 14Mo 5Fe 3W Spherical, Gas Atomized	257273-4	-45 + 16 µm (-325 mesh + 16 µm)	GE B50TF162 CL A GE B50TF192 CL A DMR 33.090 PM819-44	Oxidation and corrosion resistant. Excellent choice for nickel and cobalt component restoration.
HA7269	Ni 16Mo 15Cr 5Fe 3W Gas Atomized	257269	-53 + 20 µm (-270 mesh + 20 µm)	Standard Grade	Highly corrosion resistant. Resists localized corrosion, oxidizing acids with chloride ions and industrial chemicals.
HA7244-1	Ni 22Cr 10Al 1.0Y Spherical, Gas Atomized	257164	-106 + 53 µm (-140 + 270 mesh)	GE B50TF162 CL A GE B50TF192 CL A DMR 33.090 PM819-44	Excellent oxidation resistance and diffusional stability.
HA7244-2	Ni 22Cr 10Al 1.0Y Spherical, Gas Atomized	257211	-106 + 53 µm (-140 + 270 mesh)	GE B50TF162 CL A GE B50TF192 CL A DMR 33.090 PM819-44	
HA7246	Ni 31Cr 11Al .4Y Spherical, Gas Atomized	257246	-90 + 38 µm (-170 + 400 mesh)	EMS 57737 EMS 52432 CL XXI PM819-29	
HA7260	Ni 50Cr Gas Atomized	257260	-53 + 20 µm (-270 mesh + 20 µm)	Standard Grade	Coatings are resistant to corrosive gases in boiler temperatures. Superior bond strength.

## NICKEL BASE POWDERS

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HA7050	Ni 11Cr 4Si 2.4B 3Fe Spherical, Gas Atomized	257255	-45 + 10 µm (-325 mesh + 10 µm)	Standard Grade	Produces hard, machinable as-sprayed for fused coating. Resists wear by abrasive grains, hard surfaces, fretting, cavitation and erosion. Intermediate hardness. Excellent weldability and crack resistance.
HA7274	Ni 11Cr 4Si 3Fe 2.5B Gas Atomized	257274	-63 + 25 µm (-230 mesh + 25 µm)	Standard Grade	
HA7050-1	Ni 11Cr 4Si 2.4B 3Fe Spherical, Gas Atomized	257255-1	-106 + 45 µm (-140 + 325 mesh)	Standard Grade	
HA7050-2	Ni 11Cr 4Si 2.4B 3Fe Spherical, Gas Atomized	257255-2	-150 + 45 µm (-100 + 325 mesh)	Standard Grade	
HA7050-3	Ni 11Cr 4Si 2.4B 3Fe Spherical, Gas Atomized	257255-3	-180 + 53 µm (-80 + 270 mesh)	Standard Grade	Fused coatings, is very hard and wear resistant. Exhibit moderate shrink with low oxide content.
HA7050-4	Ni 15Cr 3.8Si 2.8B 4.2Fe Spherical, Gas Atomized	257255-4	-106 + 45 µm (-140 + 325 mesh)	Standard Grade	
HA7116	Ni 14Cr 4.5Fe 4.5Si 3.0B Spherical, Gas Atomized	257167	-106 + 45 µm (-140 + 325 mesh)	Standard Grade	
HA7276	Ni 15Cr 17W 4Si 3.5Fe Gas Atomized	257276	-53 + 20 µm (-270 mesh + 20 µm)	Standard Grade	
HA7060-2	Ni 15.5Cr 4.3Si 4Fe 3.5B Spherical, Gas Atomized	257256	-45 + 10 µm (-325 mesh + 10 µm)	Standard Grade	Good corrosion and wear properties.
HA7115	Ni 15.5Cr 4.3Si 4Fe 3.5B Spherical, Gas Atomized	257256-1	-106 + 45 µm (-140 + 325 mesh)	AMS4775	
HA7060-3	Ni 15.5Cr 4.3Si 4Fe 3.5B Spherical, Gas Atomized	257256-3	-150 + 45 µm (-100 + 325 mesh)	Standard Grade	
HA7060	Ni 15.5Cr 4.3Si 4Fe 3.5B Spherical, Gas Atomized	257256-4	-180 + 53 µm (-80 + 270 mesh)	Standard Grade	
HA7275	Ni 16.5Cr 17Mo 6Fe 4.5W Spherical, Gas Atomized	257275	-53 + 20 µm (-270 mesh + 25 µm)	Standard Grade	Resists abrasive grains, hard surfaces, cavitation, particle erosion and fretting. Corrosion resistant. Produces dense, hard, fusible, oxide-free coatings.
HA7202	Ni 19Cr 17Fe 3Mo 5Nb+Ta Spherical, Gas Atomized Course Cut (Inconel 718)	257202	-125 + 45 µm (-120 + 325 mesh)	GE B50TF202 CL A	
HA7202-1	Ni 19Cr 17Fe 3Mo 5Nb+Ta Spherical, Gas Atomized Very Fine Cut (Inconel 718)	257202-1	-90 + 45 µm (-170 + 325 mesh)	GE B50TF202 CL B	Machinable. Good Dimensional restoration.
HA7202-2	Ni 19Cr 17Fe 3Mo 5Nb+Ta Spherical, Gas Atomized Fine Cut (Inconel 718)	257202-2	-45 + 10 µm (-325 mesh + 10 µm)	Standard Grade	
HA7202-3	Ni 19Cr 17Fe 3Mo 5Nb+Ta Spherical, Gas Atomized Fine Cut (Inconel 718)	257202-3	-45 + 20 µm (-325 mesh + 20 µm)	GE B50TF202 CL D	
HA7171	NiCoCrAlY Spherical, Gas Atomized	257171	-75 + 38 µm (-200 + 400 mesh)	PWA 1365-2 CPW 387 PM-819-51	Resistant to oxidation and corrosion at high temperatures. Utilized at bond coats under stabilized zirconia coatings.
HA7171-2	NiCoCrAlY Spherical, Gas Atomized	257171-2	-45/D µm (-325/D mesh)	PWA 1365-1	
HA7591	Ni 16.5Cr 17Mo 6Fe 4.5W Spherical, Gas Atomized (Hastelloy C)	257273	-45 + 10 µm (-325 mesh + 10 µm)	Standard Grade	High deposit efficiency, fusible powder. Withstands abrasion and extreme temperatures.
HA7591-1	Ni 16.5Cr 17Mo 6Fe 4.5W Spherical, Gas Atomized (Hastelloy C)	257273-1	-53/D µm (-270/D mesh)	Standard Grade	
HA7591-2	Ni 16.5Cr 17Mo 6Fe 4.5W Spherical, Gas Atomized (Hastelloy C)	257273-2	-150 + 45 µm (-100 + 325 mesh)	Standard Grade	
HA7591-3	Ni 16.5Cr 17Mo 6Fe 4.5W Spherical, Gas Atomized (Hastelloy C)	257273-3	-180 + 53 µm (-80 + 270 mesh)	Standard Grade	

## ALUMINUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA1010-5	Al <sub>2</sub> O <sub>3</sub> 99+% Fused, Crushed	411183	-45 + 15 μm (-325 mesh + 15 μm)	EMS 56758 MSRR 9507/9 PWA 1310 DMR 33.080	Dense coatings. Good dielectric strength. Requires grinding. Resistance to abrasive wear, sliding wear, friction and oxidation.
HA1010	Al <sub>2</sub> O <sub>3</sub> 99.5% Fused, Crushed	411150	-28 + 2 μm	Standard Grade	
HA1010-1	Al <sub>2</sub> O <sub>3</sub> 99.5% Fused, Crushed	411153	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA1010-2	Al <sub>2</sub> O <sub>3</sub> 99.5% Sintered, Irregular	411101	-45 + 5 μm (-325 mesh + 5 μm)	PWA 1310	
HA1010-025	Al <sub>2</sub> O <sub>3</sub> 99.9+% Ultra Pure, Spherical	411199	-75 + 10 μm (-200 mesh + 10 μm)	Standard Grade	
HA1114-1	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Fused, Crushed	411117	-30 + 5 μm	GE A50TF87 CL C PM 819-00	Coatings are smooth and dense. Good wear resistance. Good dielectric strength at room temperatures. Require grinding. Less brittle, lower dielectric strength than pure Al <sub>2</sub> O <sub>3</sub> coatings.
HA1114	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Fused, Crushed	411110-2	-45 + 15 μm (-325 mesh + 15 μm)	EMS 52432 TYPE XXV BMS 10-67, Type III GE A50TF87 CL A MSRR 9507/36 DMR 33.020 PM819-11	
HA1114-2	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Fused, Crushed	411110	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA1114-3	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Fused, Crushed	411119	-45 + 20 μm (-325 mesh + 20 μm)	Standard Grade	
HA1114-4	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Fused, Crushed	411112	-50 + 20 μm	Standard Grade	
HA1112	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Fused, Crushed	411116	-53 (-270 mesh)	Standard Grade	
HA1112-2	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Sintered, Irregular	411419	-70 + 20 μm	GE A50TF87 CL B PWA 1311 PM 189-12 WIMS 650 MSRR 9507/50 GE A50A565 CPW 281GE	
HA1112-3	Al <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Sintered, Irregular	411159	-106 + 45 μm (-140 + 325 mesh)	GE A50TF187 CL B PWA 1311 SENECMA DMR 33.013 CPW 281	
HA1188	Al <sub>2</sub> O <sub>3</sub> 13% TiO <sub>2</sub> Sintered, Irregular	411188	-31 + 5 μm (-500 mesh + 5 μm)	Standard Grade	
HA1188-1	Al <sub>2</sub> O <sub>3</sub> 13% TiO <sub>2</sub> Sintered, Irregular	411187	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA1107-4	Al <sub>2</sub> O <sub>3</sub> 13% TiO <sub>2</sub> Fused, Chemically Uniform	411103	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	Hard, dense, smooth coatings. Good abrasive wear resistance. Less brittle, lower dielectric strength than Al <sub>2</sub> O <sub>3</sub> + 3% TiO <sub>2</sub> .
HA1120	Al <sub>2</sub> O <sub>3</sub> 30% TiO <sub>2</sub> Fused, Crushed	411101	-25 + 5 μm	Standard Grade	
HA1119	Al <sub>2</sub> O <sub>3</sub> 40% TiO <sub>2</sub> Fused, Chemically Uniform	411109	-30 + 5 μm (-500 mesh + 5 μm)	Standard Grade	Very dense, low porosity coatings with high bond strength. Can be used instead of Al <sub>2</sub> O <sub>3</sub> + 13% TiO <sub>2</sub> when grindability is a factor. Grinds to low RMS, near friction free.
HA1119-1	Al <sub>2</sub> O <sub>3</sub> 40% TiO <sub>2</sub> Fused, Chemically Uniform	411121	-45 + 5 μm (-325 mesh + 15 μm)	Standard Grade	
HA1119-2	Al <sub>2</sub> O <sub>3</sub> 40% TiO <sub>2</sub> Fused, Irregular	411108	-45 + 15 μm (-325 mesh + 5 μm)	Standard Grade	
HA1170	Al <sub>2</sub> O <sub>3</sub> 28% MgO Spinel, Spherical	411170	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	Good abrasion and wear resistance.
HA1171	Al <sub>2</sub> O <sub>3</sub> 28% MgO Spinel, Spherical	411171	-75 + 10 μm (-200 mesh + 10 μm)	Standard Grade	

## CHROMIUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA3179	Cr <sub>2</sub> O <sub>3</sub> 99% Reacted, Blocky	423179	-31 + 10 μm (-500 mesh + 10 μm)	Standard Grade	Hard, dense, wear resistant coatings. HA3106 is used predominately in the analog roll industry.
HA3179-4	Cr <sub>2</sub> O <sub>3</sub> 99% Fused, Crushed	423172	-45 + 20 μm (-200 + 325 mesh)	Standard Grade	
HA3179-1	Cr <sub>2</sub> O <sub>3</sub> 99% Reacted, Blocky	423131	-45 + 5 μm (-325 mesh + 5 μm)	BMS 10-67 Type 4	
HA3328	Cr <sub>2</sub> O <sub>3</sub> 99% Fused, Crushed	423328	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA3179-3	Cr <sub>2</sub> O <sub>3</sub> 99% Reacted, Blocky	423167-1	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA3324	Cr <sub>2</sub> O <sub>3</sub> 99% Reacted, Blocky	423324	-75 + 45 μm (-325 mesh + 20 μm)	Comp. F Type II, CL 1 EMS 52432 CL-V PWA 1325	
HA3106	Cr <sub>2</sub> O <sub>3</sub> 99% Reacted, Rounded, Metal Free	423030	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA3339	Cr <sub>2</sub> O <sub>3</sub> 3% SiO <sub>2</sub> Fused, Crushed	423339	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	Hard dense coatings. Excellent resistance to wear and corrosion.
HA3339-1	Cr <sub>2</sub> O <sub>3</sub> 3% SiO <sub>2</sub> Fused, Crushed	423338	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	
HA3341	Cr <sub>2</sub> O <sub>3</sub> 5% SiO <sub>2</sub> 3%TiO <sub>2</sub> Fused, Crushed	423341	-45 + 15 μm (-325 mesh + 15 μm)	WIMS 648	Hard dense coatings. Excellent resistance to wear and corrosion. Good friction characteristics.
HA3192	Cr <sub>2</sub> O <sub>3</sub> 5% SiO <sub>2</sub> 3%TiO <sub>2</sub> Composite	423192	-53 + 10 μm (-270 mesh + 10 μm)	Standard Grade	
HA3341-1	Cr <sub>2</sub> O <sub>3</sub> 5% SiO <sub>2</sub> 3%TiO <sub>2</sub> Fused, Crushed	423340	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	
HA3301	Cr <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Metal Free, Sintered	423301	-30 + 10 μm (-500 mesh + 10 μm)	Standard Grade	Hard dense metal-free coatings. Good for wear resistance and laser engraving.
HA3301-3	Cr <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Metal Free, Sintered	423306	-45 + 15 μm (-325 mesh + 22 μm)	Standard Grade	
HA3301-2	Cr <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Metal Free, Sintered	423307	-45 + 22 μm (-325 mesh + 15 μm)	Standard Grade	
HA3301-1	Cr <sub>2</sub> O <sub>3</sub> 3% TiO <sub>2</sub> Metal Free, Sintered	423302	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	

## TITANIUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA4000	TiO <sub>2</sub> 99% Fused, Crushed	420000	-25 + 5 μm (-425 mesh + 5 μm)	Standard Grade	Slightly conductive with moderate abrasive wear resistance.
HA4001	TiO <sub>2</sub> 99% Fused, Crushed	420001	-63 + 10 μm (-230 mesh + 10 μm)	Standard Grade	

# ZIRCONIUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA9235	ZrO <sub>2</sub> 5% CaO Calcina Stabilized	439252	-45 + 15 μm (-325 mesh + 15 μm)	DMR 33.089B PWA 1312 MTS 1067 CPW 212	Thermal Barrier and erosion resistant coatings. Used for furnaces and casting ladles.
HA9235-1	ZrO <sub>2</sub> 5% CaO Calcina Stabilized	439235	-75 + 45 μm (-200 + 325 mesh)	MSRR 9507/18 PM 819-26 EMS 56720 FT 5045 XIV	
HA9204	ZrO <sub>2</sub> 8% Y <sub>2</sub> O <sub>3</sub> Ytria Stabilized, HOSP™	439204	-75 + 10 μm (-200 mesh + 10 μm)	EMS 57750 GE A50TF204 CL C GE A50TF278 CL ABC PWA 1375 MSRR 9507/46	For thermal barrier coatings Heat and thermal shock resistant, erosion resistant
HA9204-1	ZrO <sub>2</sub> 8% Y <sub>2</sub> O <sub>3</sub> Ytria Stabilized, Spherical	439204-1	-100 + 44 μm (-140 + 325 mesh)	Standard Grade	
HA9113-1	ZrO <sub>2</sub> 8% Y <sub>2</sub> O <sub>3</sub> Agglomerated, Semi-Spherical	439182	-106 + 45 μm (-140 + 325 mesh)	GE A50TF278 CL B EMS 57750 T1	
HA9484	ZrO <sub>2</sub> 8% Y <sub>2</sub> O <sub>3</sub> Ytria Stabilized, Spherical	439484	-106 + 45 μm (-140 + 325 mesh)	GE A50TF278 CL B EMS 57750 Type I CL I PWA 1375	
HA9202	ZrO <sub>2</sub> 20% Y <sub>2</sub> O <sub>3</sub> Ytria Stabilized, Spherical	439202	-100 + 20 μm (-140 mesh + 20 μm)	MSRR 9507/37 GE A50TF204 CL A PWA 36087	
HA9103	ZrO <sub>2</sub> 22% MgO Fused, Irregular	439103	-75 + 10 μm (-200 mesh + 10 μm)	MSRR 9507/21 M3966 Type I PWA 1333	Thermal barrier coating. Resistant to molten metals and particle erosion. Heat and thermal shock resistant. Erosion resistant.
HA9103-1	ZrO <sub>2</sub> 18-25% MgO Fused, Crushed	439233	-45 + 15 μm (-325 mesh + 15 μm)	GE A50TF155 CL A PWA 1333 MSRR 9507/21	
HA9222	ZrO <sub>2</sub> 26% CeO <sub>2</sub> Stabilized, Spherical	439222	-75 + 10 μm (-200 mesh + 10 μm)	Standard Grade	Offers greater high temperature corrosion resistance against sodium, sulfur, chlorine contaminants than 8% Ytria Zirconia coatings.

## TUNGSTEN CARBIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA8109	WC 9Co Agglomerated and Sintered	328109	-38 + 10 µm (-400 mesh + 10 µm)	Standard Grade	Densified structure with fine carbide dispersions promotes finer microstructure, better DE and denser, smoother coatings. Excellent flowability. Resistant to erosion and abrasion, recommended for use in water based solution. The CoCr matrix provides higher abrasion and corrosion resistance than WC-Co. Excellent wear properties at low temperatures.
HA8350-1	WC 10Co 4Cr Agglomerated and Sintered, Spherical	328350-1	-38 + 10 µm (-400 mesh + 10 µm)	Standard Grade	
HA8350	WC 10Co 4Cr Agglomerated and Sintered, Spherical	328350	-53 + 15 µm (-270 mesh + 15 µm)	BMS 10-67, Type XVII	
HA8436	WC 10Co 4Cr Sintered, Irregular	328113	-45 + 5 µm (-325 mesh + 5 µm)	Standard Grade	
HA8436-1	WC 10Co 4Cr Sintered, Irregular	328436	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	
HA8120	WC 10Co 4Cr Densified, Spherical	328120	-45 µm /D (-325 mesh)/D	Standard Grade	
HA8320	WC 11Co 5C Sintered, Crushed	328320	-45 + 5 µm (-325 mesh + 5 µm)	Standard Grade	
HA8106	WC 12Co Cast/Crushed Irregular	328106	-45 + 5 µm (-325 mesh + 5 µm)	PWA 1379-2 BMS 10-67-1 AMS 7879	
HA8114-1	WC 12Co Sintered, Crushed Irregular	328114	-45 + 10 µm (-325 mesh + 10 µm)	AMS 7880 GE B50TF27 CL A/B PM 819-25	
HA8114-2	WC 12Co Sintered, Crushed Irregular	328489	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	
HA8104	WC 12Co Cast/Crushed	328104	-75 + 45 µm (-200 + 325 mesh)	PWA 1302 EMS 57745	
HA8342	WC 12Co Agglomerated, Sintered, Spherical	328342	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	
HA8342-2	WC 12Co Agglomerated, Sintered, Spherical	328342-1	-38 + 10 µm (-400 mesh + 10 µm)	EMS 57736	
HA8342-3	WC 12Co Spherical, Densified	328616	-53 + 11 µm (-270 mesh + 11µm)	Standard Grade	
HA8343	WC 17Co Sintered, Irregular, Spherical	328343	-45 + 15 µm (-325 mesh + 15µm)	PWA 36331-1	
HA8128	WC 17 Co Agglomerated, Sintered, Spherical	328343-1	-45 + 15 µm (-325 mesh + 15µm)	Standard Grade	
HA8343-2	WC 17 Co Agglomerated, Sintered, Spherical	328343-2	-38 + 10 µm (-400 mesh + 10 µm)	Standard Grade	Hard, tough coatings. Used to protect against sliding wear, hammer wear, abrasion and fretting. Increased cobalt offers toughness, anti-fretting and resistance impact. Good finish as-sprayed and/or lapping.
HA8310	WC 10Ni Agglomerated, Sintered, Spherical	328624	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	
HA8310-1	WC 10Ni Agglomerated, Sintered, Spherical	328624-1	-38 + 10 µm (-400 mesh + 10 µm)	Standard Grade	
HA8496	WC 20Cr 6Ni Sintered, Irregular	328496	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	
HA8356	WC 21Cr 6Ni 5C Agglomerated, Sintered, Spherical	328356	-45 + 15 µm (-325 mesh + 15 µm)	Standard Grade	Hard, dense coating with good bond strength. Excellent oxidation and corrosion resistance.
HA8334	WC 12Co + 50 Ni SF Blended	328334	-53 + 15 µm (-270 mesh + 15 µm)	Standard Grade	
					Densified structure with fine carbide dispersion properties. Excellent flowability. Excellent choice for chemical service. Produces thin, hard dense, smooth coatings. Wear and corrosion resistant.

## CHROMIUM CARBIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA2373	Cr <sub>3</sub> C <sub>2</sub> 20% NiCr Densified, Spherical	312373	-45 + 5 μm (-325 mesh + 5 μm)	PWA 36332	Good abrasion, particle erosion, cavitation, and fretting resistance. Good sliding and corrosion resistance properties and good hot gas corrosion resistance, particularly in sulphurous gases.
HA2135	Cr <sub>3</sub> C <sub>2</sub> 25% NiCr Densified, Spherical	312135	-53/D (-270/D mesh)	Standard Grade	
HA2375-1	Cr <sub>3</sub> C <sub>2</sub> 25% NiCr Densified, Spherical	312375-1	-38 + 15 μm (- mesh + 15 μm)	Standard Grade	
HA2106	Cr <sub>3</sub> C <sub>2</sub> 25% NiCr Mechanically Blended	312106	-45 + 5 μm (-325 mesh + 5 μm)	GE B50TF137 CL A MSRR 9507/17 EMS 52432 II AMS 7875	
HA2375	Cr <sub>3</sub> C <sub>2</sub> 25% NiCr Spray-Dried, Sintered, Spherical	312375	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA2376	Cr <sub>3</sub> C <sub>2</sub> 25% NiCr Agglomerated, Sintered, Spherical	312376	-53 + 20 μm (-270 mesh + 20 μm)	Standard Grade	
HA2106-2	Cr <sub>3</sub> C <sub>2</sub> 25% NiCr Mechanically Blended	312380	-106 + 45 μm (-140 + 325 mesh)	EMS 52432 GE B50TF137 CL B MSRR 9507/2 PWA 1307	
HA2410-1	Cr <sub>3</sub> C <sub>2</sub> 30% NiCr Reacted	312410-1	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA2410	Cr <sub>3</sub> C <sub>2</sub> 30% NiCr Reacted	312410	-53 + 15 μm (-270 mesh + 15 μm)	Standard Grade	
HA2410-2	Cr <sub>3</sub> C <sub>2</sub> 30% NiCr Reacted	312410-2	-106 + 45 μm (-140 + 325 mesh)	Standard Grade	
HA2425	Cr <sub>3</sub> C <sub>2</sub> 40% NiCr Reacted	312425	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	Moderate dispersion of carbide of average size. Good ductility combined with wear resistance.
HA2425-1	Cr <sub>3</sub> C <sub>2</sub> 40% NiCr Reacted	312425-1	-53 + 15 μm (-270 mesh + 1 5 μm)	Standard Grade	
HA2425-2	Cr <sub>3</sub> C <sub>2</sub> 40% NiCr Reacted	312425-2	-106 + 45 μm (-140 + 325 mesh)	Standard Grade	
HA2415	Cr <sub>3</sub> C <sub>2</sub> 65% NiCr Reacted	312415	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	Low concentration of carbide which appear small. Good ductility, toughness and corrosion resistance.
HA2415-1	Cr <sub>3</sub> C <sub>2</sub> 65% NiCr Reacted	312415-1	-53 + 15 μm (-270 mesh + 15 μm)	Standard Grade	
HA2415-2	Cr <sub>3</sub> C <sub>2</sub> 65% NiCr Reacted	312415-2	-106 + 45 μm (-140 + 325 mesh)	Standard Grade	
HA2107	Cr <sub>3</sub> C <sub>2</sub> 99.0%+ Sintered, Irregular	312105	-45 + 5 μm (-325 mesh + 5 μm)	PWA 1306	Hard and wear resistant. Usually blended with metal for spraying.
HA2107-1	Cr <sub>3</sub> C <sub>2</sub> 99.0%+ Sintered, Irregular	312107	-106 + 45 μm (-140 + 325 mesh)	PWA 1304	

## ABRADABLE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA7126	Ni 15% Graphite Composite	507126	-90 + 38 μm (-170 mesh + 30 μm)	PWA 1352-2 FP 5045AB Type XI	High quality abradable coatings for use in compressor section of jet engines.
HA7125	Ni 25% Graphite Composite	507125	-90 + 30 μm (-170 mesh + 30 μm)	PWA 1352-1 PM 819-41 FP 5045 Type XII	

## POWDER CROSS-REFERENCE

HA Name	Sulzer Metco	Praxair Tafa	Page
HA1010	105SFP		9
HA1010-1			9
HA1010-2	105-NS, Amdry 180	ALO101	9
HA1010-025			9
HA1010-5	105		9
HA1020	52C-NS	AL102	1
HA1020-1	Amdry 355	AL111	1
HA1020-2	52C-NS		1
HA1030	54NS-1	AL104	1
HA1030-2	54NS		1
HA1101			2
HA1101-2			2
HA1101-3			2
HA1103	45VF-NS	CO103	2
HA1105	45C-NS	CO105	2
HA1106			2
HA1106-1			2
HA1106-3			2
HA1106-4			2
HA1107-4			9
HA1109	Diamalloy 3002NS	CO109	2
HA1110	Amdry 345	CO110	3
HA1111	68NF-NS-1	CO111	2
HA1112	101B-NS		9
HA1112-2			9
HA1112-3			9
HA1119			9
HA1119-1	131VF	ALO121	9
HA1119-2			9
HA1120			9
HA1122			2
HA1122-1			2
HA1112-2	101NS	ALO105	9
HA1112-3	101B-NS, Amdry 187	ALO159	9
HA1114			9
HA1114-1			9
HA1114-2	101SF		9
HA1114-3	101NS		9
HA1114-4			9
HA1114-5			9
HA1114-6	130SF		9
HA1124		CO114	2
HA1159		CO159	3
HA1170			9
HA1171			9
HA1188	130SF	ALO 188	9
HA1188-1	130	ALO187	9
HA1211	Amdry 995C	CO211	2
HA1211-2		CO211-3	2
HA1217	Amdry 9951	CO127	3
HA1221			2
HA1221-1			2
HA1221-2			2
HA1245		1245F	2
HA1248	68F-NS-1, Diamalloy 3001	1248T	3

## POWDER CROSS-REFERENCE

HA Name	Sulzer Metco	Praxair Tafa	Page
HA1260-1		CO260-3	3
HA1260-2		CO260-12	3
HA1400-2			2
HA1400-3			2
HA1800-2			3
HA1800-3			3
HA1900			2
HA1900-1			2
HA1900-2			2
HA2024			1
HA2106	81VF-NS, Diamalloy 3004	CRC106	7
HA2106-2	81NS	CRC108	7
HA2107	70C-NS	CRC107	7
HA2107-1	70F-NS	CRC105	7
HA2109			7
HA2135-2			7
HA2195	Amdry 9954	CO210-1	3
HA2195-1		CO210-24	3
HA2373	Diamalloy 3007		7
HA2375	Amdry 5260	1375VM	7
HA2375-1		1375VF	7
HA2376		1376T	7
HA2410		CRC410	7
HA2410-1		CRC410-1	7
HA2410-2		CRC410-2	7
HA2415		CRC415	7
HA2415-1		CRC415-1	7
HA2415-2		CRC415-2	7
HA2425		CRC425	7
HA2425-1		CRC425-1	7
HA2425-2		CRC425-2	7
HA3106	Amdry 6420		10
HA3179		CRO179	10
HA3179-1		CRO131	10
HA3179-3		CRO167-1	10
HA3179-4			10
HA3192	136F	CRO192	10
HA3301			10
HA3301-1			10
HA3301-2			10
HA3301-3			10
HA3324			10
HA3328	Amdry 6420	CRO167	10
HA3339			10
HA3339-1			10
HA3341	136F		10
HA3341-1	136CP		10
HA4000			10
HA4001	102		10
HA4101	Amdry 500F	CU101	3
HA4102	58NS, Amdry 500C	CU102	3
HA4103	57NS, Amdry 500	CU103	3
HA4104	51F-NS, Diamalloy 1004	CU104	3
HA4104-2	51F-NS	CU104-2	3
HA4104-3	51NS	CU104-5	3
HA4105			3
HA4155			1

## POWDER CROSS-REFERENCE

HA Name	Sulzer Metco	Praxair Tafa	Page
HA4155-2	Diamalloy 1007		1
HA5000			1
HA5108		FE108-2	4
HA5211		FE211-1	4
HA5236		1236F	4
HA5420		1234F	4
HA5431	42C		4
HA5513-1	Diamalloy 1003	FE101	4
HA5513-7	41C	FE101-7	4
HA6102		MO102	1
HA6103	63NS		1
HA6105			1
HA6137	Amdry 1371		4
HA6149			4
HA7022			6
HA7040			4
HA7040-2	12C		4
HA7050			5
HA7050-1			5
HA7050-2			5
HA7050-3			5
HA7050-4			5
HA7060			5
HA7060-2	15F		5
HA7060-3			5
HA7105	43VF-NS	NI105	6
HA7105-1	43F-NS	1262F	6
HA7105-2	43F-NS	NI106	6
HA7105-4	43C-NS	NI107	6
HA7109	450NS, Amdry 956	NI109	4
HA7115	15E	NI167	5
HA7116	16C		5
HA7125	307NS	NI114	5
HA7126	308NS	NI115	5
HA7156	56F-NS	NI101	1
HA7166		1166F	1
HA7166-2	56F		1
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HA7243	443NS	NI122	6
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